ABSTRACT OF THE DISCLOSURE

[1039]   An element order independent comparison of hierarchically organized data structures may be performed efficiently using a transformation operation that orthogonally and recursively encodes child node information. In some implementations, a hash table is defined for which values are encoded as powers of two. Each value is therefore orthogonal when combined using simple binary addition. At any particular node, a concatenation of node-specific information with a sum of child-node hashes is, itself, hashed and associated with the node. Orthogonal encodings ensure that a combination (e.g., an additive combination) of values corresponding to elements of a sub-hierarchy is insensitive to ordering of the elements. Recursion can be employed to fold in information contributions at successive layers of an information hierarchy.